

- i) being able to substitute for the muscle beta1 subunit in the formation of an acetylcholine receptor, but not being able to substitute for the gamma or delta subunit of a neuronal nicotinic acetylcholine receptor;
- ii) not binding acetylcholine, nicotine or analogs thereof;
- iii) forming, in conjunction with an alpha3 or an alpha4 subunit, a neuronal nicotinic acetylcholine receptor that is blocked by bungarotoxin 3.1 but not by  $\alpha$ -bungarotoxin; and
- iv) forming, in conjunction with an alpha2 subunit, a neuronal nicotinic acetylcholine receptor that is not blocked by either bungarotoxin 3.1 or  $\alpha$ -bungarotoxin.

35 (New). The substantially pure DNA of claim 34 comprising the nucleotide sequence of pPCX49, ATCC No. 67643, or complement thereof.

36 (New). Cells transformed by the substantially pure DNA of claim 34.

37 (New). A vector containing the substantially pure DNA of claim 34.

38 (New). A RNA complementary to said polynucleotide of claim 34.

39 (New). A substantially pure polynucleotide encoding a beta2 subunit of a neuronal acetylcholine receptor, wherein said polynucleotide has at least 15 contiguous bases that hybridize under stringent conditions to the complement of the nucleotide sequence set forth in Figures 7B(1), 7B(2) and 7B(3),

wherein said beta2 subunit has one or more functional properties selected from the group consisting of:

- i) being able to substitute for the muscle beta1 subunit in the formation of an acetylcholine receptor, but not being able to substitute for the gamma or delta subunit of a neuronal nicotinic acetylcholine receptor;
- ii) not binding acetylcholine, nicotine or analogs thereof;
- iii) forming, in conjunction with an alpha3 or an alpha4 subunit, a neuronal nicotinic acetylcholine receptor that is blocked by bungarotoxin 3.1 but not by  $\alpha$ -bungarotoxin; and

iv) forming, in conjunction with an alpha2 subunit, a neuronal nicotinic acetylcholine receptor that is not blocked by either bungarotoxin 3.1 or  $\alpha$ -bungarotoxin.

40 (New). Cells transformed by the substantially pure polynucleotide of claim 39.

41 (New). A vector containing the substantially pure polynucleotide of claim 39.

42 (New). A substantially pure polynucleotide encoding a neuronal nicotinic acetylcholine receptor beta2 subunit, wherein said beta2 subunit has

a) no greater than 50% amino acid sequence identity to neuronal nicotinic acetylcholine receptor alpha subunits selected from the group consisting of alpha2, alpha3, alpha4 and alpha5;

b) 44% amino acid sequence identity to a beta3 subunit of a neuronal nicotinic acetylcholine receptor; and

c) 64% amino acid sequence identity to a beta4 subunit of a neuronal nicotinic acetylcholine receptor; and

wherein said beta2 subunit has one or more functional properties selected from the group consisting of:

i) being able to substitute for the muscle beta1 subunit in the formation of an acetylcholine receptor, but not being able to substitute for the gamma or delta subunit of a neuronal nicotinic acetylcholine receptor;

ii) not binding acetylcholine, nicotine or analogs thereof;

iii) forming, in conjunction with an alpha3 or an alpha4 subunit, a neuronal nicotinic acetylcholine receptor that is blocked by bungarotoxin 3.1 but not by  $\alpha$ -bungarotoxin; and

iv) forming, in conjunction with an alpha2 subunit, a neuronal nicotinic acetylcholine receptor that is not blocked by either bungarotoxin 3.1 or  $\alpha$ -bungarotoxin.

43 (New). Cells transformed by the substantially pure polynucleotide of claim 42.

44 (New). A vector containing the substantially pure polynucleotide of claim 42.